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GONOCOCCAL AFFECTIONS OF THE EYE *

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GONOCOCCAL affections of the eye may be divided into direct or exogenous, and metastatic or endogenous, affections.

The exogenous affections may be further subdivided according as they occur before birth, at birth, shortly after birth, in childhood, and in adult life. That gonococcal infection of the conjunctiva may occur not only before birth, but even before rupture of the membranes, appears to be proved conclusively by Cases 43 and 45 of the series of cases of ante-partum ophthalmia collected and analysed by Sydney Stephenson and Rosa Ford (*Ophthalmoscope*, April, 1906).

In the great majority of cases of gonococcal ophthalmia neonatorum, the first symptoms appear within the first four days after birth, and in these it may be assumed that infection has occurred either at birth or immediately afterwards. The liability to conjunctival infection immediately succeeding the birth of the head was recognised in 1879 by Samuel Hague, a Camberwell physician, who advised that the instant the head was born, and before the baby had had time to open the eyes, they should be wiped free from all traces of moisture, on the ground that he had attended to this point in hundreds of cases without meeting with a single case of ophthalmia, whereas during the same period ophthalmia had repeatedly developed in cases in which the child had been born before his arrival (*Brit. Med. Jour.*, June, 1879).

In 1881 Credé published articles descriptive of his procedure, which consisted in wiping the eyes with clean linen, and allowing a drop of 2 per cent. silver nitrate solution to fall in between the eyelids from a glass rod. The use of this method in his clinic was followed by a reduction in the incidence of the disease from about 10 per cent. to less than 0.5 per cent.

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From Hague's observations it would appear that the eyes are in greatest danger of infection immediately after birth, as a result of the passage between the lids of infective material from the skin, rather than during the progress of the head through the maternal passages ; infection may also be carried by the baby's hands before they have been washed, or by the water in which it has been bathed.

Conjunctivitis becoming manifest after the fifth day may be due to an infection from a maternal gonorrhœa conveyed by a finger or towel, or from a vaginitis in the baby contracted at birth.

The disease is evidenced by swelling of the eyelids, with redness and swelling of the conjunctiva. Although the swelling of the conjunctiva, particularly in the fornices, is often excessive, it has not the indurated character so often met with in adults. Conjunctival discharge, at first scanty, thin and sanious, becomes in twenty-four to forty-eight hours more copious and purulent.

Corneal complications are liable to occur, especially in weakly babies, congenital syphilitics, and the premature ; they range from an infiltration without loss of substance, and capable of resolution without impairment of sight, to ulceration leading to destruction of almost the entire cornea.

The disease may be complicated by arthritis, endocarditis, or septicæmia.

The following sequelæ may be mentioned. Total blindness may follow corneal ulceration, which may lead to disorganisation of the eye, or to secondary glaucoma consequent on obliteration of the anterior chamber, with interference with the proper filtration of the intraocular lymph ; this latter catastrophe may sometimes be averted by timely operation. Anterior capsular and cortical cataract may result from contact of an inflamed or perforated cornea with the anterior surface of the lens. Anterior capsular cataract, especially when unilateral, should always direct attention to the cornea for evidence of past inflammation in the form of a scar, which, however, owing to the remarkable power of repair in the cornea of the newly-born, may be so attenuated as easily to escape notice.

The so-called " Stephenson's lines " are seen charac-

teristically in the lower fornix of the conjunctiva on pulling the lid away from the eyeball, as horizontally disposed white cicatricial bands, with bands of red conjunctiva between them. They are valuable evidence of a past severe inflammation.

Nystagmus is met with not only in eyes more or less blinded by corneal opacities, but also in cases in which the corneæ show little or no abnormality. In these cases it seems probable that the nystagmus is attributable to a defective development of the fixation faculty, which should take place during the first few weeks of life, and, being dependent on clear retinal images, would be interfered with by enforced closure of the eyelids (Harman, Holmes Spicer).

Although gonococcal infection is responsible for the great majority of cases of severe conjunctivitis in the newly-born, it may sometimes give rise to a milder type of inflammation; while, on the other hand, severe inflammation may be due to other organisms. A bacteriological examination should therefore always be made. Organisms other than the gonococcus found in ophthalmia neonatorum are: *Streptococci*, *Staphylococci*, *Pneumococcus*, *B. Coli*, and *B. Pyocyaneus*.

A frequent source of pus in the conjunctival sac of the newly-born is atresia of the lower end of the nasal duct, with distension and inflammation of the lacrimal sac. Regurgitation of pus into the conjunctival sac on pressure over the lacrimal sac is diagnostic of the condition, which, if overlooked and neglected, is liable to give rise to abscess around the lacrimal sac.

In the examination of a case of purulent ophthalmia certain precautions should be observed. Inasmuch as there is a liability for the eyelids to become agglutinated by dried secretion, with consequent collection of a reservoir of pus behind them, their abrupt and forcible separation may result in pus spurting out from between them with such force as to reach the eyes of the examiner; the secretion uniting the lid margins should therefore, in the first place, be softened by application of lotion on cotton-wool. The use of protective glasses is a further wise precaution. In separation of the eyelids all pressure on the eyeball should be avoided, lest it should cause perforation of a cornea weakened by ulceration. The utmost care should be taken to avoid abrasion of the

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cornea by the finger nails in separating the eyelids ; on account of the possibility of their producing corneal abrasion, lid retractions are, in my opinion, a source of danger.

With regard to treatment of the disease, I have seen not a few cases in which bad results were almost certainly attributable to what may be called over-treatment, in the form of frequent use of strongly irritating applications, such as 1 in 5,000 perchloride of mercury lotion. This drug should not, in my opinion, be used in stronger concentration than 1 in 20,000.

As a result of extensive experience with various lotions at the St. Margaret's Hospital for ophthalmia neonatorum Mr. M. S. Mayou has concluded that a solution of eusol, not exceeding 1 in 6 in strength, for washing away the conjunctival discharge, followed by instillation of acriflavine (1 in 1,500 in castor-oil), is the most satisfactory means of cleansing the conjunctival sac, the procedure being repeated every one to three hours, according to the severity of the case. The application of a 1 per cent. solution of silver nitrate every morning to the conjunctiva of the everted eyelids is, in my opinion, a valuable procedure, as is the instillation once daily of chloride of zinc drops in the strength of 1 grain to the ounce.

Although good results have been reported after use of the Sterian serum, and with the Dmego vaccine of Nicolle and Blaizot, Mayou concluded from his experience at St. Margaret's Hospital that both ordinary and detoxicated vaccines were of no value (*Trans. Ophth. Soc., U.K., 1920*).

Liebermann has reported excellent results after milk injections (*Zeit. f. Augenh., v., 46, 1921*).

Prophylaxis in the case of the newly-born is concerned with :

(1) Elimination of gonococcal infection in the parents. Such infection is liable to pass unnoticed, as, for example, when producing no obvious symptoms in the mother, who has derived the infection from a husband believing himself free from infectivity.

(2) Notification and treatment of vaginal discharge in the expectant mother.

(3) Prophylactic treatment of the baby at birth, preferably by the Credé method, or a modification of this in the use of a 1 per cent. silver nitrate solution. Avoid-

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ance of contact of the child's hands before washing, or of the bath water, with the eyes. Instruction of midwives on these lines.

(4) Notification and immediate treatment of the disease.

(5) Admission to hospital of the baby with the mother, where the baby should be nursed by, but kept in a separate bed from, the mother. Failing admission to hospital, supervision of the treatment in the home.

(6) In the case of home treatment instruction of the attendants of the child as to the dangerous character of the disease, and the necessity of all precautions against infection of other members of the household.

(7) Treatment of the mother and of the father.

(8) Adequate instruction of medical students.

Gonococcal conjunctivitis in children is a rare disease in this country, the subjects being usually girls suffering from vaginitis ; as regards treatment it may be grouped with gonococcal conjunctivitis in adults.

Gonococcal conjunctivitis in adults is, relatively to the prevalence of gonococcal venereal disease, a remarkably rare affection. It is, however, a much more formidable disease than the common affection of the newly-born, a fact which may possibly find its explanation, to some extent at any rate, in a partial immunity acquired by the baby from its mother. Mild cases are occasionally met with.

Severe cases are characterised by pronounced induration of the greatly swollen lids, rendering eversion difficult or impossible, and by indurated swelling of the bulbar conjunctiva, which tends to form a rampart overlapping the margin of the cornea ; in the recess so formed ulceration is very liable to occur. The conjunctival discharge, at first scanty and sanious, soon becomes purulent.

Treatment may be carried out on the same lines as in ophthalmia neonatorum, but here again, as in the latter condition, the harmful possibilities of over-treatment must be clearly recognised.

I have had good results in cases treated by washing away at three-hourly intervals the discharge from between the eyelids with cotton-wool soaked in boracic acid and sulphate of zinc ($\frac{1}{2}$ grain to the ounce) lotion, followed by instillation alternately of 5 per cent. protargol and one-tenth per cent. chloride of zinc drops, the conjunctiva of

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the everted lids being in addition painted each morning with a 1 per cent. nitrate of silver solution. The process of cleansing the conjunctiva may in many cases be greatly facilitated by free division of the outer canthus.

Livingstone (*Brit. Med. Jour.*, 1919) has reported remarkable success with colloidal manganese injections, and Domec good results from milk injections (*La Clin. Ophth.*, September and October, 1917).

Delorme (*Archiv. d'Ophth.*, March, 1916) and Darier (*La Clin. Ophth.*, September, 1917) have had good results with Nicolle and Blaizot's Dmegan vaccine.

Prophylaxis is concerned with the instruction of all subjects of gonorrhœa as to the danger of ocular infection ; and, in cases of uniocular conjunctivitis, in the protection of the unaffected eye. This may be best accomplished by the use of a Buller's shield, a watch-glass fastened over the eye by strapping in such a way that there is no risk of infective material gaining access to it from the affected eye. In an eye which has been so covered for several days the appearance of a slight conjunctivitis of no serious significance is not uncommon.

Endogenous gonorrhœal inflammation of the eye is met with in the form of conjunctivitis and of iridocyclitis.

Endogenous conjunctivitis is a rare condition, characterised by slight swelling with redness of the conjunctiva of the fornices and of the conjunctiva and subconjunctival tissue of the eyeball, with scanty secretion from which gonococci are absent. It is often bilateral and associated with rheumatism, and is of transitory character, but tends to recur.

The condition may be satisfactorily treated with instillations of weak protargol and chloride of zinc drops, and application of dilute yellow oxide of mercury lotion.

Commoner by far as an endogenous gonorrhœal inflammation is iridocyclitis. This condition, which may be regarded as confined to the male sex, has been known to occur within a fortnight of the initial gonorrhœal infection, but in most cases there is a history of protracted urethritis complicated by rheumatism, frequently affecting the ankles and feet, the eye affection supervening as a further complication at an interval after the original urethral infection which varies from a few weeks to many years. It is very frequently bilateral, although both eyes

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are seldom attacked at the same time, and in many cases there is a history of numerous attacks in each eye, usually associated with exacerbations of rheumatism, and often of short duration, and resulting in surprisingly little permanent damage to the eye.

The credit for recognising the relationship of antecedent gonorrhœa to rheumatic and relapsing iritis is due to John Griffith, by whom it was clearly demonstrated twenty-five years ago (*Trans. Ophth. Soc. U.K.*, 1900).

Twelve years ago A. S. Cobbledick pointed out that in cases of relapsing iritis it was possible by means of massage of the prostate and vesiculæ seminales to demonstrate the presence in these organs of gonococci even as long as thirty years after the original infection.

An attack of gonorrhœal iritis is usually attended by great pain, referred not only to the eye, but also to the brow, nose, and teeth. Examination of the eye reveals a zone of deeply-seated dusky injection surrounding the cornea, and evidence of inflammation of the iris varying from a slight hyperæmia and discoloration, with cloudiness of the aqueous humour, to intense inflammation with yellow lymph in the pupil and deposit of pus at the bottom of the anterior chamber. The formation of a transparent jelly-like coagulum in the anterior chamber is not rare, and whenever present in a case of iritis may be regarded as highly suggestive of a gonorrhœal origin. The inflamed iris tends to crowd into the pupil, and to adhere by its posterior surface to the anterior surface of the lens; the pupil is therefore small and more or less inactive, and usually dilates slowly and irregularly under the influence of a mydriatic. The intraocular tension is seldom much increased, except in those cases in which the formation of an adhesion of the entire pupillary border of the iris to the lens has resulted in accumulation of the aqueous humour in the posterior chamber with secondary glaucoma.

Local treatment should be directed to obtaining full dilatation of the pupil and relief of pain. For the first of these purposes an ointment containing 2 per cent. atropine with 2 per cent. cocaine may be used every two hours during the first, and if necessary every four hours during the second, day, a 1 per cent. atropine ointment being substituted after two days. Heat, in the form of either hot bathing or an electric pad, will reinforce the

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action of the atropine and help to relieve pain. Leeches applied to the temple are of great value in reducing congestion and relieving pain.

Purgatives should be used freely, and aspirin, atophan, and salicylate of soda may be taken internally for relief of pain.

A uro-genital infection must be sought for and treated, but it may be advisable to refrain from prostatic massage in the acute stages of the intraocular inflammation.

Vaccine treatment has, in my opinion, a beneficial effect, and I have never seen permanent ill effects result from its use.

It is remarkable that this type of iritis is seldom or never met with in females. On the other hand, a severe chronic iridocyclitis, with tendency to exacerbations, is met with in women much more frequently than in men. Is it possible that this disease, for which it is often very difficult to find a satisfactory cause, may be in some cases a complication of a gonorrhœal infection deeply seated, *e.g.*, in a Fallopian tube ?